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State of California  
THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 119-5

FEASIBILITY OF SERVING  
THE SOLANO COUNTY FLOOD CONTROL  
AND WATER CONSERVATION DISTRICT  
FROM THE STATE WATER PROJECT

NOVEMBER 1964

HUGO FISHER  
*Administrator*  
The Resources Agency

EDMUND G. BROWN  
*Governor*  
State of California

WILLIAM E. WARNE  
*Director*  
Department of Water Resources



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## FOREWORD

In November 1960, the California Water Resources Development Bond Act was approved by the State's electorate, paving the way for the construction of the State Water Project. Since that time, many local water service agencies throughout the State have applied to the Department of Water Resources for consideration as potential contractors with the State for water service from the proposed facilities. Several water agencies have been organized and formed since November 1960 expressly for the purpose of obtaining supplemental water supplies from the State facilities for the areas they represent.

Prior to executing contracts for a water supply with public agencies, the Department of Water Resources made studies of those agencies and the areas encompassed by them to determine the propriety of entering into such contracts. These studies were made with the goal of evaluating (1) each area's future demand for supplemental water supplies, (2) the legal ability of each agency in question to enter into a water supply contract with the State, (3) the engineering feasibility of providing the proposed water service, and (4) the financial ability of each agency and its constituent area to bear the financial burden necessarily imposed upon it by a water supply contract with the State.

The results of the studies made of each agency, as described above, along with significant incidental and supporting material, have been embodied in separate reports and have or will

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The Resources Agency  
DEPARTMENT OF WATER RESOURCES

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## CHAPTER I. INTRODUCTION

The Solano County Flood Control and Water Conservation District contracted with the Department of Water Resources on December 26, 1963, for the delivery of supplemental water from the State Water Project. The contract provides for a maximum annual delivery of 42,000 acre-feet of which 37,800 acre-feet annually will be delivered from the North Bay Aqueduct and 4,200 acre-feet annually will be delivered at the Sacramento-San Joaquin Delta.

Information developed within this report was utilized for the contract with the district and was basic for determination of the need and economic justification for the district's participation in the State Water Project.

### Purpose of the Report

This report is intended to support the need for supplemental water within Solano County and to support the economic justification of meeting this need from the State Water Project. The report updates the planning studies for the North Bay Aqueduct contained in Bulletin No. 110, "North Bay Aqueduct," Department of Water Resources, December 1961. It also includes the most recent estimates of the cost of water which the district has contracted for, the repayment schedule of these costs, and the basic data and analysis utilized to determine the district's capability to meet the financial obligations of the contract.

## North Bay Aqueduct

Investigation of the North Bay Aqueduct was originally authorized by the Abshire-Kelly Salinity Control Barrier Acts of 1953 and 1955. The aqueduct was proposed in Bulletin No. 60, "Interim Report to the California State Legislature on the Salinity Control Barrier Investigation," Department of Water Resources, March 1957, with plans for delivery of fresh water to the counties of Solano, Napa, Sonoma, and Marin.

Bulletin No. 60 recommended authorization of the North Bay Aqueduct for construction as a feature of the California Water Plan, the appropriation of funds for the acquisition of lands, easements, and rights-of-way, and the preparation of construction plans and specifications. The Legislature, by enactment of Water Code Section 11270 (California Statutes 1957, Chapter 2252, page 3917) authorized the North Bay Aqueduct as a unit of the California Water Plan and appropriated \$1,340,000 for the preparation of construction plans and specifications. In 1959 the Legislature appropriated an additional \$1,000,000 for acquisition of lands, easements, and rights-of-way.

Following a public meeting of the North Bay counties on April 28, 1960, a re-evaluation study of the North Bay Aqueduct was undertaken. The results of this study were reported in Bulletin No. 110, and concluded that the North Bay Aqueduct was the most feasible means of meeting near future requirements for supplemental water in the "North Bay area." The North Bay area is defined as that study area which encompasses those portions of



the four North Bay counties, including Solano, which lie within the drainage area tributary to San Francisco Bay. Based on the estimates of future water requirements, an aqueduct capable of serving approximately 115,000 acre-feet of water per year to the North Bay area was evaluated and determined to be feasible for construction. Of this amount, 12,200 acre-feet of water per year were included for Solano County for agricultural use.

The Solano County Flood Control and Water Conservation District indicated by letter, April 13, 1961, its estimates of the potential need in Solano County for water from the North Bay Aqueduct. This letter stated:

"....there exists in the service area of the North Bay Aqueduct in Solano County a potential demand for 21,500 acre-feet of urban and industrial water in the year 1990. To utilize this water it will be necessary to integrate the supply of the North Bay Aqueduct with that of the Solano Project so that deficiencies in the Solano Project can be made up by North Bay Aqueduct water. In addition, the North Bay Aqueduct could satisfy some demands not contemplated in the existing schedule of demands of the Solano Project."

Late in 1962, after adoption of Decision D869 by the State Water Rights Board, Solano County conducted a full review of its future water needs. This review indicated that Decision D869 would result in a reduction of 57,000 acre-feet in the yield of the Solano Project. In consideration of this reduction in yield and additional requests for water which had been made by member units of the district, it was concluded by the county that an additional water supply of 75,000 acre-feet would be needed by 1990. On November 8, 1963, the County Administrator

informed the department that Solano County's participation in the North Bay Aqueduct might amount to as much as 75,000 acre-feet annually.

As contract negotiations reached the December 31, 1963, deadline the district refined its request to a maximum annual entitlement of 42,000 acre-feet annually with initial deliveries to commence in 1980. The reduction in the request was based upon reductions in the requests of member units of the district as well as the probability that the full reduction in the yield of the Solano Project would not occur until after 1990. The district also indicated that it would not contract for a water supply from the North Bay Aqueduct unless construction of reaches of the aqueduct between the Delta and Cordelia was deferred until after 1975.

Napa County, in the course of final negotiations, concluded that it would contract for a 25,000 acre-foot maximum annual entitlement from the North Bay Aqueduct. Because Napa County's needs were more immediate, it was able to work out a solution with Solano County and the City of Vallejo whereby initial water supplies at Cordelia would be obtained from the Putah South Canal or by transporting state project water across Solano County through the Cache Slough Pipeline of the City of Vallejo. Marin and Sonoma Counties concluded that their water supply problems could best be solved by diverting from the Russian River system.

The North Bay Aqueduct Project, now supported by contracts with Solano and Napa Counties, will consist of an aqueduct, with a capacity of 65,600 acre-feet per year and with construction deferred until after 1975, which will carry water across Solano County, and

an aqueduct from Cordelia in Solano County into Napa County with 25,000 acre-feet of annual capacity and from which deliveries will probably be made during the late 1960's.

#### Description of the Service Area

Solano County is located between the Coast Range on the west, the Sacramento River on the east, Putah Creek on the north, and Suisun and San Pablo Bays on the south. The gross area of the county is 529,280 acres, of which 50,700 acres are water surface area. Major water courses within the county include the Sacramento River and Putah Creek, which flows along the northern boundary of the county and drains southeastward from the Coast Range in Napa and Lake Counties. Other important natural water areas within the county include San Pablo Bay, Mare Island Strait, Carquinez Strait, and Suisun Bay.

The portion of Solano County within the San Francisco Bay hydrographic area and referred to as the north bay area in this report, includes all lands which drain into the Sacramento River and San Pablo and Suisun Bays below the confluence of the Sacramento and San Joaquin Rivers near Collinsville. Lands within Solano County which drain directly into the Sacramento River above Collinsville are excluded from the north bay area. The North Bay area of Solano County is depicted on Plate 1, entitled "North Bay Area, Solano County."

The topography of the county is exemplified by the gently sloping valley lands in the east rising to an elevation of about 100 feet at the base of the Coast Range foothills in the west. The

western portion of the county reaches a maximum elevation of 2,819 feet. The Montezuma Hills, which are located in the southeastern portion of the county, consist of low rolling hills with a maximum elevation of over 250 feet. The valley area varies from 15 to 25 miles east to west and is about 30 miles long.

The climate of Solano County is typical of the two-season Central Valley. A cool wet season occurs between November and April at which time 90 percent of the precipitation occurs. A warm dry season prevails during May through October. Precipitation varies from 16 inches to 25 inches per year with larger amounts in the higher elevations of the Coast Range. Temperature varies from an average low of about 40 degrees during the winter to an average high of about 90 degrees during the summer. Lands adjacent to Suisun Bay and San Pablo Bay are susceptible to the coastal fogs which often penetrate into the San Francisco Bay system.

#### History of the Area

Early exploration of Solano County was accomplished by Spanish soldiers and missionaries. This exploration was followed by the settlement of a number of large cattle ranches on Mexican land grants. In 1849, settlers brought to California by the "Gold Rush" settled in Solano County to raise fruit, sheep, and cattle. Since the main route from San Francisco to the gold mines in the Sierra Nevada passed through Solano County, this settlement occurred quite rapidly. Formal recognition was gained by the county with an act of the Legislature in 1850. The State Capitol was located in Benicia during 1853-54 for a short time prior to

being moved to Sacramento. During the 1860's disastrous floods followed by severe droughts caused extreme losses to the cattle ranches. This period was followed by the development of a more diversified agricultural base including irrigated and dry farm crops.

In 1879, the Central Pacific Railroad (now Southern Pacific) completed the railroad between Sacramento and Benicia. This railroad, combined with the arsenal at Benicia and naval shipyard at Mare Island, spurred growth of the county forward to a level of about 24,000 people at the turn of the century. Growth since 1900 has primarily centered around continued development of the agricultural economy with rapid development occurring parallel to accelerated military activity during World War I. By 1920 the population had reached a level over 40,000 people and by 1950 the population was in excess of 100,000 people.

#### Description of the Contracting Agency

The district was established by the Solano County Flood Control and Water Conservation Act (California Statutes 1951, Chapter 1656, page 3748), for the purposes of controlling and conserving surface water supplies and contracting with other entities for the storage, delivery, and sale of water supplies. The boundaries of the district are identical with those of the county. The governing body of the district is the Solano County Board of Supervisors which acts in an ex officio capacity as the Board of Directors of the district.

### Ability to Contract with the State

The ability of the district to contract with the State is specifically defined in Section 6.3 of the enabling legislation. This section states that the district "shall have the power to... contract with the State ... in the purchase and sale of water...."

In addition, the district is a state agency within the meaning of that term as defined in Water Code Section 11102. As such an agency, the district pursuant to Section 11661 "may enter into and execute appropriate contracts with the department for any and all the purposes and objects" of the provisions of the Water Code governing the Central Valley Project.

### Power of District to Finance its Contract with the State

The district has the power under Section 5 of the district act, "but only as to member units or for the benefit of any agency of the State ... or of the United States ..., to ... dispose of water or any rights to the use of the works of the district for the ... control or transportation of water" and "to fix rates and charges for such purpose."

Under Section 10 of the district act, the district has the power, as provided in the act, "to cause taxes to be levied for the purpose of paying any obligation of the district and to accomplish the purposes of the district." Section 10.1 generally limits the ad valorem tax the district may levy to pay its costs and expenses and carry out the objects of the district act to not more than 15¢ on each \$100 of the assessed valuation of the taxable property in the district. Such limitation, however, is expressly exclusive of any tax levied (1) to meet the bonded indebtedness of the district, and (2) for the payment of any portion of any indebtedness represented

by capital obligations underwritten by member units or represented by the amounts agreed to be paid by member units for any water or water supply.

In addition, the governing body of the district, as the governing body in a state agency which has contracted to purchase water from the department is required, under Water Code Section 11651, to "provide for the punctual payment to the department of all amounts which become due under the contract." And under Water Code Section 11652, such governing body must:

" . . . whenever necessary, levy upon all property in the State agency not exempt from taxation, a tax or assessment sufficient to provide for all payments under the contract then due or to become due within the then current fiscal year."

#### Member Units

A major purpose of the Solano County Flood Control and Water Conservation District is the development of new sources of water supply to solve countywide water problems. It is within the framework of this major purpose that the district contracted for the entire yield of the Solano Project and contracted with the State for North Bay Aqueduct water. In this capacity, the district acts as a wholesale water supplier and contracts with smaller governmental entities most of which act as retail water suppliers. These smaller entities who contract with the district are called member units. Member units of the district presently include Vallejo, Benicia, Suisun, Fairfield, Vacaville, the Solano Irrigation District, the Maine Prairie Irrigation District, the University of California at Davis, and the Vacaville Medical Facility of the State of California Department of Corrections.





## CHAPTER II. PRESENT AND FUTURE DEVELOPMENT OF THE ECONOMY OF SOLANO COUNTY

During the past several decades, continued development of the economy of Solano County has occurred. This development has been represented by continuing increases in population, total employment, manufacturing employment, personal incomes, and agricultural production. Extensive acreages of land have also been gradually converted from grazing and field crop uses to more intensive uses such as orchards, tomatoes, and other crops requiring the availability of adequate water supplies. The extent and rate of present development have been prime factors in establishing the need for development of additional water supplies for Solano County.

### Population

Population increased within Solano County at the rate of over 110 percent from 1940 to 1950 and 29 percent from 1950 to 1960. During the 1940's, a peak population of over 120,000 people was reached. This peak resulted from the intensified activities being carried out at the Mare Island Naval Shipyard and Benicia Arsenal during World War II. After World War II, the population of the county declined somewhat but has now recovered to an estimated level of about 150,000 people, thus well exceeding the peak that occurred during the 1940's. The historic population of Solano County is indicated in Table 1.

TABLE 1  
HISTORIC POPULATION OF SOLANO COUNTY

<u>Year</u>	<u>Population</u>
1890	20,900
1900	24,100
1910	27,600
1920	40,600
1930	40,800
1940	49,100
1950	104,800
1960	134,600
1963	150,600 <sup>1/</sup>

<sup>1/</sup> Estimated by the Department of Finance, State of California.

Future growth of population within the county will be related to a number of factors. The rapid expansion of the San Francisco Bay area urban development south to San Mateo and Santa Clara Counties and east to Alameda and Contra Costa Counties has resulted in Solano County's population increasing only moderately. With improving transportation media, the desirability of Solano County as a residential area for the employment centers within Contra Costa County and other areas is steadily increasing. The opening of the Benicia-Martinez Bridge in 1962 has already resulted in accelerated urban development in Benicia. Other areas such as Vallejo, Cordelia, and Green Valley may soon feel the impetus of these transportation media.

The industrial potential of Solano County will also have a significant effect upon future population growth. Other factors which will lead to sustained increases in population include (1) the location of U. S. Highway 40, with its increasing demand for services by motorists and commercial traffic, (2) the steadily increasing amounts of irrigated agricultural acreage with its resulting demand for workers to process, ship, and market products, (3) the economic influence of the expansion of the Sacramento metropolitan area into Yolo County, and (4) the potential for recreational development along the Sacramento River and Suisun Bay.

The exact effect of each of the above factors cannot be accurately defined, but for projections of probable development it is believed that in addition to the natural causes of population growth, the following rates of migration from other areas to Solano County can be sustained:

<u>Decade</u>	<u>People per decade</u>
1960 - 1970	30,000
1970 - 1980	65,000
1980 - 1990	80,000

These rates of net migration in combination with the natural growth of population will result in the future population estimated in Table 2.

TABLE 2

PROJECTED POPULATION OF SOLANO COUNTY  
UNDER CONDITIONS OF PROBABLE ECONOMIC DEVELOPMENT

<u>Year</u>	Population ( <u>in thousands</u> )
1970	195
1980	302
1990	458

The population estimates presented in Table 2 were utilized for the purpose of determining future urban and domestic water requirements in Solano County. To conservatively determine the ability of the Solano County Flood Control and Water Conservation District to repay the financial obligations of a contract for a water supply from the North Bay Aqueduct, population projections were prepared, which reflected a reduced rate of economic development. These projections are the result of assumed net migrations of about half those utilized in the projection of population under conditions of probable economic development. Population estimates based on a lower level of economic development are contained in Table 3.

TABLE 3

PROJECTED POPULATION OF SOLANO COUNTY  
UNDER CONDITIONS OF A REDUCED RATE OF ECONOMIC DEVELOPMENT

<u>Year</u>	Population ( <u>in thousands</u> )
1970	177
1980	241
1990	354

## Distribution of Population Projections

For the purposes of estimating future municipal and industrial water requirements, the population estimates under probable economic conditions were distributed among specific townships. The boundaries of these townships are indicated on Plate 1. These distributions were based upon data from the 1960 census, estimated ultimate populations for planning areas as determined by the Solano County Planning Commission, and determinations of areas most susceptible to economic expansion during the next 30 years. The distributions of present and future population are indicated in Table 4.

TABLE 4

DISTRIBUTION OF THE PRESENT AND FUTURE  
POPULATION OF SOLANO COUNTY  
(Thousands of persons)

Townships	Year			
	: 1960	: 1970	: 1980	: 1990
North Bay Area				
Vallejo	69.0	90	121	155
Benicia	6.4	12	26	55
Green Valley	1.2	4	9	17
Suisun	30.2	45	65	90
Other	<u>0.5</u>	<u>1</u>	<u>1</u>	<u>6</u>
Subtotal	107.3	152	222	323
Vacaville township	17.6	27	47	76
Other Areas	<u>9.7</u>	<u>16</u>	<u>33</u>	<u>59</u>
TOTAL COUNTY POPULATION	134.6	195	302	458

## Industrial Development

A major factor in the future development of the economy of Solano County will be the location of major manufacturing industries. The existing industrial economy of the county, other than federal government installations, is not significant. However, the advantages of Solano County for the location of a significant portion of the future expansion of the industrial economy of the San Francisco Bay area are rapidly increasing.

### Industrial Economy of the San Francisco Bay Area

Extensive studies of the manufacturing segment of the San Francisco Bay area industrial economy were made as a part of the work reported in Bulletin No. 76, "Delta Water Facilities," Department of Water Resources, December 1960. Minor revisions to these studies have recently been made with the conclusion that the manufacturing employments listed in Table 5 probably will be attained.

TABLE 5

PRESENT AND FUTURE MANUFACTURING EMPLOYMENT  
WITHIN THE SAN FRANCISCO BAY AREA  
(Thousands of employees)

<u>Year</u>	<u>Employment</u>
1960	274
1970	388
1980	513
1990	645

## Industrial Site Advantages of Solano County

Historically, Solano County has been located a considerable distance from the major market and labor centers of the bay area. This disadvantage is rapidly diminishing since industrial sites close to these centers are being utilized at an accelerated pace or involve extremely high land and development costs. In addition, the population expansion of the bay area into Contra Costa County has placed skilled labor markets relatively close to Solano County.

The economic advantages of large industrial tracts with low land development costs and proximity to skilled labor markets place Solano County in a steadily improving position to enhance its other geographical advantages for industrial location. These other advantages include major transportation facilities (U. S. Highway 40, State Route 21, which is designated as a freeway route from Cordelia to the Benicia-Martinez Bridge and upon which construction has commenced, the Southern Pacific and Sacramento Northern Railroads, and deep water shipping), desirable climate, convenience of waste disposal to the San Francisco Bay system, and existing water supply systems to initially serve significant developments. Areas which include these advantages are the Benicia Arsenal property which will soon be leased by an industrial development corporation and various areas near Travis Air Force Base. In view of these advantages, it has been concluded that Solano County will receive an increasing portion of the expanding industry within the bay area. Estimates of these increases in terms of manufacturing employment are contained in Table 6.

TABLE 6  
PRESENT AND FUTURE MANUFACTURING EMPLOYMENT  
IN SOLANO COUNTY

<u>Year</u>	<u>Percent of bay area</u>	<u>Percent of bay area increase</u>	<u>Solano County manufacturing employment</u>
1960	0.9	1.3	2,300
1970	1.0	2.0	3,800
1980	1.3	4.7	6,600
1990	2.0	0	13,000

The application of a reasonable ratio of manufacturing employment to total population shows that the manufacturing employment within Solano County, as indicated in Table 6, will in itself result in a population increase of about 100,000 people by 1990.

#### Military Installations

The location of major military installations within Solano County constitutes a major factor in the county economy. These installations include the Mare Island Naval Shipyard and Travis Air Force Base. The effect which can occur by reductions in activities of installations of this type is dramatically illustrated by the rapid decrease in population which occurred within Solano County after World War II, and more recently, by the effect of the closing of the Benicia arsenal in 1960.

For the purposes of estimating water requirements, it has been assumed that activities of these installations will remain near present levels. In terms of long-term economic development, it seems extremely unlikely that reduction in military



activities at these installations would not eventually be replaced by some other activity with equal economic influence. Short-term economic development might be severely hindered by any reduction in these activities.

The Benicia Arsenal provides an example of how the active efforts of the various local entities and citizens can attempt to alleviate the effect of a cancellation in activities at a major military base. Until 1960 this base supported a major segment of the economy of southwestern Solano County. In 1958, employment at the arsenal exceeded 3,000 employees. In 1960, the federal government determined that the Benicia Arsenal was no longer needed for the defense program. Action was immediately initiated to discontinue the arsenal's operations. The initial effect of this move was severe on the local economy and in particular on the City of Benicia, but local citizens, with the help of state and federal agencies, were able to develop a plan which will materially benefit the area.

This plan provides that the arsenal property be sold to the City of Benicia, which will retain title. The city will then lease the property to an industrial development corporation, which intends to make major improvements to the site such as provision of access for deep water shipping. These improvements combined with other advantages of the site should present a very favorable climate for industrial development. Hence, while the City of Benicia and the surrounding area has suffered a severe economic setback, the potential development of the area has been considerably enhanced. Long range economic development of the area may actually accelerate to higher levels than might have been experienced by continuation of the military activities.

## Agricultural Development

Lands within the North Bay area of Solano County which will be available for agricultural development in 1990 were classified during the studies reported in Bulletin No. 110. This classification is summarized in Table 7.

TABLE 7

### CLASSIFICATION OF PROJECTED AGRICULTURAL LANDS<sup>1/</sup> WITHIN THE NORTH BAY AREA OF SOLANO COUNTY

<u>Classification</u> <sup>2/</sup>	<u>Acres</u>
V	9,400
Vp	2,100
Vs	48,200
H	1,500
Hp	<u>100</u>
Total	61,300

<sup>1/</sup> Excludes lands within the Solano Irrigation District.

<sup>2/</sup> Classification legend (refers to climatically adaptable crops).

V - suited to all climatically adaptable crops.

VP - suited to shallow, or moderately deep-rooted crops.

Vs - suited to crops tolerant to excess concentration of soluble salts.

H - suited to crops which can be grown on slightly or moderately rolling topography.

Hp - suited to shallow, or moderately deep-rooted crops which can be grown on slightly or moderately rolling topography.

Table 7 indicates that a total of 61,300 acres are available for being irrigated in 1990. However, this total acreage is partially reduced when the various economic factors influencing agricultural development of these lands are taken into consideration. It

estimated in Bulletin No. 110 that of the lands available for agricultural uses outside of the Solano Irrigation District, only 21,500 acres could be economically irrigated. The projected crop pattern for these lands is indicated in Table 8.

Table 8

PROJECTED 1990 CROP PATTERN  
IN THE NORTH BAY AREA OF SOLANO COUNTY <sup>1/</sup>

<u>Crop Group</u>	<u>Acres</u>
Orchard and vines	2,100
Truck	7,100
Field	11,200
Forage	<u>1,100</u>
Total	21,500

<sup>1/</sup> Excludes lands within the Solano  
Irrigation District.

The demand for the development of new lands for irrigation in Solano County is indicated by trends in agricultural land use. Irrigated land use in the county nearly doubled in the period 1949 to 1959. Over 55,000 acres were irrigated in 1949 while in 1959 nearly 110,000 acres were irrigated. Since 1959, the initial year of delivery of agricultural water from the Solano Project, over 40,000 acres of the Solano Irrigation District have been brought under irrigation. Development of additional land within the district is continuing at rates comparable to those experienced since 1959. At the present time only the availability of low-cost water would appear as a limiting factor in the continued expansion of the irrigated agricultural economy of Solano County.



### CHAPTER III. DEMAND IN SOLANO COUNTY FOR WATER FROM THE NORTH BAY AQUEDUCT

The demand in Solano County for water from the North Bay Aqueduct will be dependent upon (1) the future water requirements of the North Bay area of Solano County, (2) the existing supplies available to meet these requirements, and (3) the method by which the North Bay Aqueduct may be integrated with the Putah South Canal of the Solano Project and other water supplies. Analysis of these factors has been made in the studies basic to this report.

#### Water Supplies

The water supplies presently available to the North Bay area of Solano County for present and future needs are derived from several sources. These sources include (1) surface water; (2) ground water; and (3) an import from Conn Lake of the City of Napa.

#### Surface Water

Surface water supplies in the service area are derived from the Solano Project via the Putah South Canal, the Sacramento River via the Cache Slough diversion of the City of Vallejo, the Suisun Creek group, miscellaneous streams which run off the Vaca Mountains, and the ranges between Napa and Fairfield.

Existing development on the miscellaneous streams include Lake Curry on Suisun Creek and Lakes Madigan and Frey on Wild Horse Creek, all of which are operated and maintained by the City of Vallejo; Lakes Hermon and Paddy, which are operated by the City of Benicia (not considered as a firm water supply); a small reservoir

operated by the City of Suisun; and a number of minor reservoirs owned and operated by local farmers. The safe yield of the above developments has been estimated to be 6,000 acre-feet per year, of which 5,500 acre-feet can be utilized to meet urban requirements. The remaining yield is used for agricultural purposes.

Future development of surface water supplies in the service area appears extremely limited. Advantageous reservoir sites are not available and the hydrology of the area dictates large storage-to-yield ratios. The development which may occur will probably be limited to additional small reservoirs constructed to meet local agricultural water requirements.

Solano Project. The Solano Project was constructed by the Bureau of Reclamation for the purposes of flood control and the storage, diversion, and distribution of water from Putah Creek for agricultural, municipal, and industrial uses. Major facilities of the project include Monticello Dam on Putah Creek, Lake Berryessa which is formed by Monticello Dam and has a capacity of 1,600,000 acre-feet, Putah Diversion Dam which is located on Putah Creek downstream from Monticello Reservoir, and the Putah South Canal, a 38-mile concrete-lined canal which extends from the Putah Diversion Dam north of Fairfield to a point west of Green Valley Creek near Cordelia. Construction of the project was initiated after the district and the bureau had agreed on March 7, 1955, on a contract for the delivery of water from the project and for the repayment of the capital and annual costs. Facilities of the project are indicated on Plate 2, "Existing Water Development Facilities in Solano County."

Prior to construction of the project it was estimated at the firm yield would amount to 247,000 acre-feet annually. Operating experience obtained since completion of the project and Decision D869 of the State Water Rights Board have resulted in reductions in the estimated yield of the project to less than 190,000 acre-feet. Table 9 indicates the factors which have been taken into consideration in determining this reduced yield.

Table 9

REDUCTIONS IN THE YIELD OF THE SOLANO PROJECT

Estimated yield in original contract - 247,000 acre-feet

Reductions

Increased evaporation losses	10,000 A. F.
Upstream riparian and ground water use	10,000 A. F.
Required downstream releases	10,000 A. F.
Water Rights Board Decision D869	33,000 A. F.

Total reduction	63,000 A. F.
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Presently estimated yield	184,000 A. F.
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The most important reduction in the yield of the Solano project has resulted from Decision D869 of the State Water Rights Board. This decision attached the following conditions to operation of the project:

" . . . Permittee shall release water into Putah Creek channel from Monticello Reservoir and past the Putah Diversion Dam in such amounts and at such times and rates as will be sufficient, together with inflow from downstream tributary sources, to supply downstream diversions of the surface flow under vested prior rights to the extent water would have been available for such diversions from unregulated flow, and sufficient to maintain percolation of water from the stream channel as such percolation would occur from unregulated flow, in order

that operation of the project shall not reduce natural recharge of groundwater from Putah Creek . . ."

". . . the permits and all rights acquired or to be acquired thereunder are and shall remain subject to depletion of stream flow above Monticello Reservoir, not to exceed 33,000 acre-feet of water annually, by future appropriations of water for reasonable beneficial use within the watershed of Putah Creek above said reservoir; provided such future appropriations shall be initiated and consumated pursuant to law prior to full beneficial use of water within the project service area under these permits . . ."

The yield of the Solano Project is subcontracted by the district to its member units. Contracts with the member units as of November 1963 are defined in Table 10.

Table 10

CONTRACTS FOR SOLANO PROJECT YIELD

Member unit	Contracted amount				
	af/year				
	Date of contract:	1964-74:	1974-84:	1984-94:	1994-1999
<u>Urban water use</u>					
Benicia	11/12/57	250	1,100	1,500	3,000
Fairfield	6/28/55	1,500	2,890	4,740	6,200
Suisun	6/28/55	280	750	1,230	1,600
Vacaville	6/28/55	960	2,600	4,280	5,600
Vallejo	6/28/55	<u>2,530</u>	<u>6,860</u>	<u>11,270</u>	<u>14,750</u>
Subtotal		5,520	14,200	23,020	31,150
<u>Agricultural water use</u>					
Solano I. D.	6/25/55	75,000	141,000	141,000	141,000
Calif. Medical Facility	12/28/62	600	1,200	1,200	1,200
U. of California, Davis	12/27/62	2,000	4,000	4,000	4,000
Maine Prairie W. D.	7/ 9/63	<u>5,000</u>	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>
Subtotal		<u>82,600</u>	<u>161,200</u>	<u>161,200</u>	<u>161,200</u>
Total contracted water		88,120	175,400	184,220	192,350



In addition to the contracted demands on the Solano Project, there are operational losses which will be incurred within the Putah South Canal. These losses are presently estimated to be 9,000 acre-feet per year.

On the basis of the contract demands and operational losses, and the estimated ultimate firm yield of the Solano Project, it is concluded that a deficiency of over 17,000 acre-feet annually will exist in the project. At what point in time this deficiency will initially be noticed is dependent upon the rate of buildup of demands upstream from Lake Berryessa. At this time it appears that the project can meet all demands through 1990.

The portion of the Solano Project yield which will be available to the North Bay area of Solano County consists of the amounts of municipal and industrial water contracted by the cities of Fairfield, Suisun, Benicia, and Vallejo, and the quantity of water available for agricultural use on lands within the Solano Irrigation District. Maximum contract amounts with the mentioned cities total 25,550 acre-feet annually. Agricultural water available for lands in the North Bay area of the Solano Irrigation District was computed on the basis of the ratio of the area of the district within the North Bay area and the total area within the district. This supply was found to be 29,450 acre-feet annually. In total, an import from the Solano Project of 55,000 acre-feet annually is available to the North Bay area.

Cache Slough System of City of Vallejo. The Cache Slough diversion system of the City of Vallejo was completed in the spring of 1953. The system includes a pumping plant at Cache Slough which is capable of diverting up to 32.5 cubic feet per second, a 36-inch concrete pipeline between the pumping plant and a treatment plant site immediately north of Travis Air Force Base, and a 36-inch diameter pipeline between the treatment plant site and a reservoir immediately south of Highway 40 near Cordelia. The system is capable of delivering 32.2 cubic feet per second as far as Travis Air Force Base and 23.5 cubic feet per second to the Cordelia Reservoir. Water is diverted from Cache Slough by virtue of a water right for the diversion of 23,000 acre-feet of water per year. Present diversions of water through the system are in excess of 10,000 acre-feet per year. Full development of the diversion right is dependent upon the integration of the pipeline with seasonal reservoir storage. For the purposes of this report the full right has been assumed to be developable. The layout of the Vallejo system is indicated on Plate 2.

#### Ground Water

Utilization of ground water in the service area occurs in the Fairfield-Suisun area and in Green Valley north of Cordelia. Sufficient data are not presently available to accurately determine the safe yield of these basins. In the report, "Geology and Ground Water Resources of the Putah and Suisun-Fairfield Areas," U. S. Geological Survey, June 1956, it was concluded that sustained pumping rates of 6,000 acre-feet per year in the Fairfield-Suisun area and 1,000 acre-feet per year in the Green Valley area have not caused serious overdrafts of either ground water basin.

Future rates of ground water pumpage have been estimated on the basis that the estimated 1952 rates of 6,500 acre-feet per year in the Fairfield-Suisun area, and 1,400 acre-feet per year in the Green Valley area could be sustained. Increases over the estimates cited by the Geological Survey are based upon increased supplies from the percolation of irrigation water from within the Solano Irrigation District

For purposes of this report, it was assumed that all existing ground water supplies will be used for agricultural purposes.

#### Import

Conn Lake. Imports from Conn Lake to Benicia by the California-Pacific Utilities Company are defined by a contract with the City of Napa for 1,290 acre-feet annually. This contract terminates in 1970 and notice has been given that the contract will not be renewed.

#### New Supplies

At this time no new water supply facilities other than the North Bay Aqueduct are authorized for the North Bay area of Solano County.

#### Summary

Available municipal and industrial water supplies in the North Bay area of Solano County are summarized in Table 11.

Table 11

AVAILABLE MUNICIPAL AND INDUSTRIAL WATER SUPPLIES  
IN THE NORTH BAY AREA OF SOLANO COUNTY  
(Acre-feet per year)

<u>Supply</u>	<u>Quantity</u>
<u>Surface water</u>	
Solano Project (Putah South Canal) Contracted municipal and industrial	25,500
City of Vallejo (Sacramento River)	23,000
City of Vallejo	5,400
City of Suisun	100
Subtotal	54,050
<u>Import</u>	
City of Benicia (City of Napa <u>1/</u> )	(1,300)
Total available supply	54,050

1/ Contract terminates in 1970; not included in total.

Present and Future Water Requirements

For the purposes of this report, the unit agricultural water requirements established in Bulletin No. 110 have been utilized. Modifications to the urban water requirements determined in Bulletin No. 110 have been made to reflect revised population distributions and revised per capita water requirements.

## Municipal and Industrial Water Requirements

Municipal and industrial requirements in the North Bay area have been analyzed by townships. The requirements were estimated by multiplying the population projections listed in Table 4 by projected per capita water requirements for each township. Per capita water requirements were increased above estimated present values at the rate of 10 gallons per capita per day per decade. The per capita estimates are included in Table 12.

Table 12

### UNIT MUNICIPAL AND INDUSTRIAL WATER REQUIREMENTS IN THE NORTH BAY AREA OF SOLANO COUNTY (Gallons per capita per day)

Township <sup>1/</sup>	Year			
	: 1960	: 1970	: 1980	: 1990
Benicia	115	125	135	145
Denverton <sup>2/</sup>	--	--	--	--
Green Valley	135	145	155	165
Suisun	155	165	175	185
Vacaville <sup>3/</sup>	180	190	200	210
Vallejo	135	145	155	165
Unincorporated Areas	150	160	170	180

<sup>1/</sup> Estimates of unit requirements for specific townships include only incorporated areas.

<sup>2/</sup> Not estimated.

<sup>3/</sup> Not within north bay area but included for purposes of comparing supplemented municipal and industrial water requirements with the deficiencies and additional requests of the Solano Project.

In addition to the allowances for industrial water requirements which are provided for within the estimates of per capita water use, additional requirements will accompany the development of the Benicia Arsenal property and areas east of Fairfield. The magnitude of these requirements will be dependent upon the types of industries which locate within these areas. This information is not available

at this time. It has been concluded that a potential 1990 demand of 10,000 acre-feet annually for this type of use could be supported without placing undue financial hardship upon the district.

Municipal and industrial water requirements are summarized in Table 13. Vacaville township is included for the purposes of comparing supplemental municipal and industrial water requirements with the summation of deficiencies and additional requests of the Solano Project.

Table 13

MUNICIPAL AND INDUSTRIAL WATER REQUIREMENTS<sup>1/</sup>  
NORTH BAY AREA OF SOLANO COUNTY  
(Thousands of acre-feet per year)

Township	Year			
	1960	1970	1980	1990
Benicia	0.8	1.7	4.0	9.0
Denverton	0.1	0.2	0.2	1.2
Green Valley	0.2	0.7	1.6	2.9
Suisun	5.2	8.3	12.7	18.5
Vallejo	<u>10.4</u>	<u>14.7</u>	<u>21.0</u>	<u>28.8</u>
Subtotal	16.7	25.6	39.5	60.4
Special industrial use within north bay area	<u>0.0</u>	<u>1.0</u>	<u>5.0</u>	<u>10.0</u>
Subtotal	16.7	26.6	44.5	70.4
Vacaville <sup>2/</sup>	<u>3.3</u>	<u>5.5</u>	<u>10.3</u>	<u>17.7</u>
TOTAL	20.0	32.1	54.8	88.1

<sup>1/</sup> Reflects the requirements of unincorporated as well as incorporated areas.

<sup>2/</sup> Not within north bay area, but included for purposes of comparing supplemental municipal and industrial water requirements with the deficiencies and additional requests of the Solano Project

## Agricultural Water Requirements

Agricultural water requirements as defined in Bulletin No. 110 were utilized in the studies covered by this report. Unit water use by crop is tabulated in Table 14.

Table 14

ESTIMATED ANNUAL UNIT VALUES OF WATER USE  
BY CROP IN NORTH BAY AREA OF SOLANO COUNTY  
(In feet of depth)

Crop	Land class 1/ : V, Vs, H, Hp : Vp	
Pears	2.1	
Walnuts	2.2	
Prunes		
Wine grapes		
Sweet corn	1.6	1.7
Cauliflower	1.6	1.7
Tomatoes	1.6	1.7
Asparagus	1.6	1.7
Grain-sweet corn <sup>2/</sup>	2.2	2.4
Cauliflower-tomatoes <sup>2/</sup>	2.4	2.5
Cauliflower-sweet corn <sup>2/</sup>	2.4	2.5
Milo	1.6	
Corn silage	1.6	
Sugar beets	1.6	1.7
Safflower	1.6	
Field corn	1.6	
Barley	1.3	1.4
Oats	1.3	1.4
Grain	1.3	1.4
Barley-milo <sup>2/</sup>	2.2	
Oats-corn silage <sup>2/</sup>	2.2	
Sugar beets-corn <sup>2/</sup>	2.4	
Safflower-milo <sup>2/</sup>	2.4	
Alfalfa	2.9	
Beef pasture	3.0	
Dairy pasture	3.0	

<sup>1/</sup> Land class legend in Table 7.

<sup>2/</sup> Double crops.

Previous studies, outlined in Bulletin No. 110, indicated that a potential demand for agricultural water amounting to some 42,700 acre-feet per year could exist in 1990 in the North Bay area on lands outside the Solano Irrigation District. This requirement was estimated from the unit water uses tabulated in Table 13 and the crop patterns defined in Table 8.

However, those areas adjacent to the Solano Irrigation District probably will have an available water supply at less cost than from the North Bay Aqueduct. In addition, certain other lands were omitted from consideration due to marginal repayment capacity under the estimated cost of North Bay Aqueduct water. As a result of these considerations, the 1990 supplemental agricultural water requirements reported in Bulletin No. 110 were reduced to 12,200 acre-feet, which represented the estimated amount of water from the North Bay Aqueduct which could be economically utilized in Solano County.

#### Future Supplemental Water Requirements

The demands for supplemental water in the north bay area of Solano County have been analyzed in terms of the requirements for water and the supplies available to meet these requirements. An additional analysis has been made of the requests for additional water by member units of the district and the deficiencies in the yield of the Solano project.

#### Municipal and Industrial Water

The total municipal and industrial demand of the North Bay area (including Vacaville) was estimated in Table 13 to be 88,100



acre-feet in 1990, of which 61,650 acre-feet (including supplies available to Vacaville) could be met by local supplies and from the Solano Project and Sacramento River. Considering the lower cost of municipal and industrial water from the North Bay Aqueduct, presumably the water for these purposes from the Solano Project would be held to the contract minimum of 31,150 acre-feet per year. The difference between demand and supply for 1990, 26,450 acre-feet, would be supplied from the North Bay Aqueduct.

#### Agricultural Water

Supplemental agricultural water requirements in the North Bay area which could be economically met by the North Bay Aqueduct have been estimated to be 12,200 acre-feet per year in 1990.

#### Requests for Additional Water

Member units of the district have submitted requests for additional water. These requests are summarized in Table 15.

#### Deficiency of Solano Project

Although an ultimate deficiency of over 17,000 acre-feet annually may exist in the Solano Project, it appears at this time that the project can meet all contracted demands defined in Table 10 until 1990. Therefore, the deficiency has not been considered in determining the demands for water from the North Bay Aqueduct.

Table 15

REQUESTS FOR ADDITIONAL  
WATER FROM THE SOLANO FC&WCD

(Acre-feet per year)

<u>Agency</u>	<u>Period</u>			
	<u>1964-74</u>	<u>1974-84</u>	<u>1984-94</u>	<u>1994-99</u>
Solano Irrigation District	5,000	15,000	15,000	15,000
Benicia	0	40,000	40,000	40,000
Fairfield	2,110	5,660	10,500	16,800
Vacaville	180	420	500	920
Suisun <sup>1/</sup>	1,000	0	1,000	3,200
Napa County	<u>1,000</u>	<u>2,500</u>	<u>5,000</u>	<u>7,500</u>
	<u>8,290</u>	<u>63,080</u>	<u>72,000</u>	<u>83,420</u>

1/ Not included in total since Solano County contends that this water should be derived from the provisions of Water Rights Board Decision D869.

Summary

The total supplemental water requirement of the north bay area of Solano County in 1990 is estimated to be 38,650 acre-feet annually in 1990. This amount is based on a requirement of 26,450 acre-feet for municipal and industrial use and 12,400 acre-feet for agricultural use. The estimated total closely corresponds to the maximum annual entitlement which has been contracted from the North Bay Aqueduct by Solano County.

In comparison, additional requests of the district total 72,000 acre-feet annually during the contract period covering 1990. However, 5,000 acre-feet of this total represents the request of Napa County for water for its Lake Berryessa recreation area. Solano County claims that this water should be derived from

the 33,000 acre-feet reserved for upstream uses in Decision D869 of the State Water Rights Board. In addition, the City of Benicia has substantially lowered its request to about 15,000 acre-feet. These two adjustments result in lowering the requests of member units for additional water to 42,000 acre-feet, an amount which corresponds to the contracted maximum annual entitlement.

#### Initial Delivery of Project Water

The contract with Solano County provides that initial delivery of water from the North Bay Aqueduct will be made in 1980. Table 13 indicates that the demands for municipal and industrial water in 1980 in the North Bay area total 54,800 acre-feet annually. A supply of 55,700 acre-feet annually is available to meet these requirements. Therefore, if agricultural requirements are excluded, the initial delivery of water in 1980 is realistic.

#### Distribution of Contract Water

Contracts have been written by the district with member units to support most of the district's maximum annual entitlement from the North Bay Aqueduct. Although contracts with member units for Solano Project and North Bay Aqueduct water will be eventually integrated, it is not known how this integration will be accomplished. The distribution of the North Bay Aqueduct water among member units is indicated in Table 16.

Table 16

DISTRIBUTION OF SOLANO COUNTY'S  
ANNUAL ENTITLEMENTS

(Acre-feet per year)

<u>Member unit</u>	<u>1980</u>	<u>1990</u>
Benicia	5,625	10,650
Fairfield	300	5,500
Suisun	0	1,000
Vacaville	335	3,700
Vallejo	<u>500</u>	<u>4,200</u>
Subtotal	6,750	25,050
5-City option pool	--	8,350
Development pool	<u>--</u>	<u>8,600</u>
Total	6,750	42,000

#### CHAPTER IV. COST OF WATER SERVICE TO SOLANO COUNTY FROM THE NORTH BAY AQUEDUCT

The cost of water service from the North Bay Aqueduct to the Solano County Flood Control and Water Conservation District will include the district's allocated portion of the construction, operation, and maintenance costs of the aqueduct; the costs accruing from the Delta Water Charge; and the cost of local conveyance and treatment facilities. Local conveyance systems will be constructed by the district or member units of the district. Construction of the North Bay Aqueduct, on the other hand, will be accomplished by the State and will be financed with monies obtained from the sale of general obligation bonds as authorized under the Water Resources Development Act of 1960.

Capital and annual costs associated with each reach of the North Bay Aqueduct will be allocated to the contracting agencies on the basis of the proportionate use of facilities method specified in the water supply contract. The measure of proportionate use is based upon the average of the following two ratios: (1) the ratio of the contractor's maximum annual entitlement to be delivered from or through the reach to the total of the maximum annual entitlements of all contractors and (2) the ratio of the capacity provided in the reach for the transport and delivery of project water to the contractor to the total capacity provided in the reach.

### Aqueduct Facilities

The cost of North Bay Aqueduct water to the district cannot be accurately estimated at the present time since construction of the features required for delivery of water to Solano County will be deferred until after 1975 and design studies have not been initiated. Preliminary cost estimates have been developed for the purposes of this report. These estimates were based on facilities capable of transporting to Cordelia the maximum annual entitlements of Solano and Napa Counties with peak monthly demands of 11 percent of the entitlement. Schedules of capital costs were developed on the basis of construction of the aqueduct from the Delta to Cordelia prior to 1980 and acquisition of rights-of-way during 1966. The alignment of the aqueduct through Solano County is indicated on Plate 3, "North Bay Aqueduct and Local Facilities for Service of Project Water."

### Cost of Facilities

The total allocated capital cost of the North Bay Aqueduct to the district is estimated to be approximately \$3,000,000 for the maximum annual entitlement of 42,000 acre-feet. This will require a maximum annual repayment of principal and interest by the district of about \$127,000. The annual capital repayment would be less than this amount in the years prior to 1988 and after 2015.

Operation and maintenance charges will be assessed in two ways. A minimum charge will be assessed each year for operation and maintenance of the facilities regardless of the amount of water delivered and a variable charge will be levied, based on the actual water delivered to the district. The maximum amount of these charges for the district is estimated to be approximately \$95,400 and \$8,800 per year respectively.

The final component of annual cost to the district for water deliveries from the North Bay Aqueduct will be the Delta Water Charge. This is the charge to the water users of the State Water Facilities for repayment of all those costs associated with project conservation facilities. At the present time, the Delta Water Rate is estimated to be \$3.50 per acre-foot through 1969, \$5.46 per acre-foot for the period 1970 through 1977, and then increase to \$7.34 per acre-foot.

Over the entire repayment period the equivalent unit rate or average charge for water from the North Bay Aqueduct to the district will be approximately \$14.53 per acre-foot. This charge is based on the capitalization of all costs at four percent interest. This cost includes the Delta Water Charge, the allocated capital costs and all annual costs of the North Bay Aqueduct.

Table 17 indicates the estimated annual component costs of water service from the North Bay Aqueduct to the district during the probable project repayment period.

#### Local Conveyance and Water Treatment Costs

An additional component of the cost of North Bay Aqueduct water to the eventual consumer will consist of the cost of facilities for conveyance and water treatment. These facilities will be constructed by the district or member units of the district. Accordingly, the costs associated with their construction, financing, and operation will not be directly associated with the district's repayment of its allocated cost of the North Bay Aqueduct. However, these conveyance and treatment costs have been estimated so an approximate water rate to the ultimate consumer might be determined.

TABLE 17  
SUMMARY OF WATER CHARGES  
FOR  
SOLANO COUNTY FCA&WCD

(I. Dollars, unless otherwise noted.)

Calendar Year	ANNUAL ENTITLEMENTS  In. acre-feet	ALLOCATED TRANS- PORTATION CAPITAL COSTS	TRANSPORTATION CHARGE					DELTA WATER CHARGE	TOTAL WATER CHARGES	
			Capital Cost Component (Table D)			Minimum OMP & R Component	Variable OMP & R Component			Total Trans- portation Charge
			Annual Principal payment	Annual Interest Payment	Total Annual Payment (Table G)					
	(Table A)	(Table C)				(Tables E&G)	(Tables F&G)	(Table G)		
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	415658	0	0	0	0	0	0	0	0
1966	0	39525	3165	14582	17747	0	0	17747	0	17747
1967	0	83540	3577	15858	19435	0	0	19435	0	19435
1968	0	154019	4341	18661	23002	0	0	23002	0	23002
1969	0	25200	5667	23911	29578	0	0	29578	0	29578
1970	0	25200	6252	24595	30654	0	0	30654	0	30654
1971	0	24682	6464	25266	31730	0	0	31730	0	31730
1972	0	24682	6877	25907	32784	0	0	32784	0	32784
1973	0	24682	7308	26530	33838	0	0	33838	0	33838
1974	0	24682	7753	27139	34892	0	0	34892	0	34892
1975	0	24682	8210	27736	35946	0	0	35946	0	35946
1976	0	37339	8687	28313	37000	0	0	37000	0	37000
1977	0	94298	9281	29313	38594	0	0	38594	0	38594
1978	0	816928	10319	32301	42620	0	0	42620	0	42620
1979	0	1027503	16905	60594	77499	0	0	77499	0	77499
1980	6750	0	25326	26042	121368	96370	2529	220267	49545	269812
1981	8000	0	26216	95152	121368	95736	2673	219777	56720	278497
1982	9400	0	27135	94233	121368	95679	2795	219842	68996	288838
1983	10800	4603	28082	93286	121368	95622	2900	219890	79272	299152
1984	12100	64438	29101	92464	121565	95506	2940	220011	88814	308825
1985	14000	0	30614	93702	124316	95564	4268	224148	102760	325508
1986	16500	4603	31681	92635	124316	95564	4485	224365	121110	345475
1987	20000	64438	32834	91679	124513	95506	4840	224859	146800	371559
1988	27000	0	34476	92788	127264	95506	7061	229831	198180	428011
1989	34500	0	35682	91582	127264	95506	8239	231009	253230	484239
1990	42000	0	36940	90324	127264	95449	8803	231516	308280	539796
1991	42000	0	38229	89035	127264	95449	8803	231516	308280	539796
1992	42000	0	39568	87696	127264	95449	8803	231516	308280	539796
1993	42000	0	40958	86306	127264	95449	8803	231516	308280	539796
1994	42000	0	42388	84876	127264	95449	8803	231516	308280	539796
1995	42000	0	43879	83385	127264	95449	8803	231516	308280	539796
1996	42000	0	45420	81844	127264	95449	8803	231516	308280	539796
1997	42000	0	47003	80261	127264	95449	8803	231516	308280	539796
1998	42000	0	48664	78600	127264	95449	8803	231516	308280	539796
1999	42000	0	50371	76893	127264	95449	8803	231516	308280	539796
2000	42000	0	52137	75127	127264	95449	8803	231516	308280	539796
2001	42000	0	53962	73302	127264	95449	8803	231516	308280	539796
2002	42000	0	55850	71414	127264	95449	8803	231516	308280	539796
2003	42000	0	57808	69455	127264	95449	8803	231516	308280	539796
2004	42000	0	59836	67428	127264	95449	8803	231516	308280	539796
2005	42000	0	61937	65327	127264	95449	8803	231516	308280	539796
2006	42000	0	64107	63157	127264	95449	8803	231516	308280	539796
2007	42000	0	66357	60907	127264	95449	8803	231516	308280	539796
2008	42000	0	68682	58582	127264	95449	8803	231516	308280	539796
2009	42000	0	71096	56168	127264	95449	8803	231516	308280	539796
2010	42000	0	73589	53675	127264	95449	8803	231516	308280	539796
2011	42000	0	76168	51096	127264	95449	8803	231516	308280	539796
2012	42000	0	78836	48428	127264	95449	8803	231516	308280	539796
2013	42000	0	81596	45668	127264	95449	8803	231516	308280	539796
2014	42000	0	84465	42799	127264	95449	8803	231516	308280	539796
2015	42000	0	87429	39835	127264	95449	8803	231516	308280	539796
2016	42000	0	90482	36775	109517	95449	8803	213769	308280	522049
2017	42000	0	93605	34224	107829	95449	8803	212081	308280	520361
2018	42000	0	96764	31638	104262	95449	8803	208514	308280	516794
2019	42000	0	99931	29084	97686	95449	8803	201938	308280	510218
2020	42000	0	99931	26679	96610	95449	8803	200862	308280	509142
2021	42000	0	71314	24220	95534	95449	8803	199786	308280	508066
2022	42000	0	72759	21721	94480	95449	8803	198732	308280	507012
2023	42000	0	74254	19132	93426	95449	8803	197678	308280	505958
2024	42000	0	75811	16561	92372	95449	8803	196624	308280	504904
2025	42000	0	77420	13988	91318	95449	8803	195570	308280	503850
2026	42000	0	79081	11183	90264	95449	8803	194516	308280	502795
2027	42000	0	80264	8406	88670	95449	8803	192922	308280	501202
2028	42000	0	79052	5592	84644	95449	8803	188496	308280	497178
2029	42000	0	66948	2817	49765	95449	8803	154017	308280	462297
2030	42000	0	4732	1164	5896	95449	8803	110148	308280	418428
2031	42000	0	4895	1001	5896	95449	8803	110148	308280	418428
2032	42000	0	5069	827	5896	95449	8803	110148	308280	418428
2033	42000	0	5250	646	5896	95449	8803	110148	308280	418428
2034	42000	0	5231	468	4699	95449	8803	109951	308280	418231
2035	42000	0	2665	283	2948	95449	8803	107200	308280	415480
2036	42000	0	2760	188	2948	95449	8803	107200	308280	415480
2037	42000	0	2658	93	2751	95449	8803	107003	308280	415283
2038	42000	0	0	0	0	95449	8803	104252	308280	412532
2039	42000	0	0	0	0	95449	8803	104252	308280	412532
TOTAL	2259050	2980702	2980702	3382498	6363200	5729009	482880	12575089	16581427	29156515

NOTES: 1. Based on estimated costs of the project as of March, 1964.

2. The Delta Water Charge represents the product of the annual entitlement times \$3.50 per acre-foot through the year 1965, \$5.46 for the years 1970-1977, inclusive, and \$7.34 thereafter.



Estimates of water treatment and conveyance costs depend upon several factors: (1) location of the ultimate water user in relation to the water supply, (2) the quantity of water to be delivered, (3) the purpose for which the water will be used, and (4) the quality of the raw water. At the present time definite plans for the treatment and conveyance of North Bay Aqueduct water have not been formulated. However, to arrive at some estimate of the costs involved in constructing typical facilities and to determine the additional debt which would be imposed upon the area served, systems were assumed and evaluated on the basis of the distribution of aqueduct water to member units as indicated in Table 16.

The scheme chosen for the purposes of this report consists of municipal and industrial water from the North Bay Aqueduct delivered to the cities of Benicia, Fairfield, Suisun, Vacaville, and Vallejo. Typical treatment plant costs were developed by the department previously and reported in Bulletin No. 110. The facilities required are shown on Plate 3.

Fairfield-Suisun. It was assumed that water for the urban areas of Fairfield and Suisun would be delivered from the aqueduct to a treatment plant immediately adjacent to the aqueduct. Transportation facilities from the aqueduct to the treatment plant site would be minimum under this assumption. Capacity of the treatment plant was assumed to be 6,500 acre-feet per year.

Benicia. Facilities for the service of water to the Benicia area would include 12 miles of pipeline from Cordelia to the city limits, a pumping plant at Cordelia, and a treatment plant at Benicia. These facilities would be constructed in 1973

and initially convey water from the Solano Project. The treatment plant would be staged with the initial stage constructed in 1973 and the second stage in 1978.

Vacaville. Facilities for the service of water to the Vacaville area would include 10 miles of pipeline, a pumping plant at the turnout from the North Bay Aqueduct, and a treatment plant at the pipeline terminus. Facilities would be constructed in 1979 with a capacity of 3,700 acre-feet annually.

Vallejo. Delivery of water to the City of Vallejo was assumed to be accomplished through the existing Cache Slough Pipeline system. Modifications to this system will undoubtedly be required. Since these modifications may be constructed as part of the proposal of Napa County to transport, until 1980, its annual entitlements to project water through the system to Cordelia, the costs of additions to the system were not considered as part of the cost of obtaining water from the North Bay Aqueduct. Treatment facilities, which will be required for water delivered to Vallejo, will probably be staged as an addition to a plant for the treatment of Solano Project water.

Costs. Estimated costs of the above facilities are indicated in Table 18.

Table 18

ESTIMATED LOCAL CONVEYANCE AND TREATMENT COSTS  
FOR NORTH BAY AQUEDUCT WATER

Facility	Area			
	Benicia	Suisun	Vacaville	Vallejo
Capital cost (\$)				
Conveyance	1,372,000	-	625,000	-
Treatment	<u>1,830,000</u>	1,380,000	<u>950,000</u>	<u>330,000</u>
Total	3,202,000	1,380,000	1,575,000	330,000
Unit cost (\$/AF) <sup>1/</sup>				
Conveyance	16.20	-	17.60	6.00
Treatment	<u>25.00</u>	<u>31.00</u>	<u>37.20</u>	<u>18.60</u>
Total	41.20	31.00	54.80	24.60

<sup>1/</sup> Includes principal, interest, operation, maintenance, replacement, and energy.



## CHAPTER V. ECONOMIC JUSTIFICATION AND FINANCIAL CAPABILITY

Important considerations that must be made relative to the execution of a contract for water service from the State Water Facilities are the questions of economic justification and the financial capability for performance of the contract. Economic justification is required to prove the feasibility of investment of state funds for the proposed water service facilities. Financial capability must be demonstrated to insure that the contracting agency can meet the financial obligations incurred under the contract.

### Economic Justification

The benefits that would accrue by the service of municipal and industrial water through any water supply system are extremely difficult to evaluate. One method of evaluation suggests that the cost of the least expensive alternative water supply system can be used to indicate the benefit of the proposed project.

Accurate estimates of the cost of alternative methods of municipal and industrial supply to Solano County have not been evaluated. Since the estimated equivalent unit cost to Solano County of North Bay Aqueduct water (approximately \$14.50 per acre-foot) is about the same as the charge for water from the Putah South Canal (\$15.00 per acre-foot), it is reasonable to assume there is no less expensive supplemental water project which could be constructed at this time.

An additional benefit which may accrue by the delivery of municipal and industrial water from the North Bay Aqueduct to Solano County will be the release for agricultural use of Solano Project water presently reserved for municipal and industrial use. The total monetary value of the benefit of this water has not been evaluated, but it is believed that it may allow several thousand additional acres of agricultural land to be irrigated.

#### Financial Capability

Financial capability of the contracting agency indicates that the public credit will be strong enough to reasonably support and repay the long-term debt which it must necessarily undertake to finance water facilities under this contract. It is necessary to show that the district will not be unduly burdened by debt during the project repayment period and that the methods of obtaining funds for debt repayment are practical and reasonable.

In appraising the financial capability of the Solano County Flood Control and Water Conservation District, the entire district whose boundaries are coterminous with those of the county, has been considered. For comparative purposes, a partial analysis of the portion of Solano County within the North Bay area has also been made.

#### Present and Proposed Assessed Valuations

The assessed valuation within Solano County Flood Control and Water Conservation District as of June 30, 1963, has been reported to be over \$200,000,000. A market value of over \$800,000,000 is

represented by this valuation. In the North Bay area, the assessed valuation in 1962 has been estimated to be nearly \$120,000,000.

The historical rate of growth of assessed valuation within the district has averaged over five percent per year during the last seven years. A similar rate of growth has been estimated for the north bay area within Solano County. Tabulations of assessed valuation and annual rates of growth for the district and North Bay area are contained in Table 19.

Table 19

HISTORICAL AND PRESENT ASSESSED VALUATION

: Solano County			: North bay area of Solano County <sup>2/</sup>	
<sup>1/</sup> Year:	Assessed valuation:	:Annual rate: of increase:	Assessed valuation:	:Annual rate of increase
1957	\$152,358,000	3.9	\$ 91,843,400	
1958	158,231,400	3.9	94,234,800	2.6
1959	164,428,700	3.0	100,252,400	6.4
1960	178,833,100	8.8	110,272,500	10.0
1961	184,091,100	2.9	113,642,700	3.0
1962	193,580,000	5.2	119,500,000 <sup>3/</sup>	5.2
1963	207,902,800	7.4	Not estimated	

<sup>1/</sup> As of June 30.

<sup>2/</sup> Determined by addition of assessed valuations of Vallejo and Benicia Unified School Districts, and Amijo High School District. Assessed valuation for 1961 was estimated as percentage of total assessed valuation of county. Portion of Amijo High School District within Napa County was assumed to be equal to areas in Denverton and Montezuma townships.

<sup>3/</sup> Estimated.

Per capita assessed valuation in Solano County has historically increased at rates comparable to the state average. In spite of these increases, the present valuation per capita is considerably below the state average. This low valuation is explained by the location of large federal government installations and the large areas of undeveloped land within the county. Estimated historical per capita assessed valuation for the district is contained in Table 20.

Table 20  
HISTORICAL PER CAPITA ASSESSED VALUATION  
IN SOLANO COUNTY

Year <sup>1/</sup>	Estimated population	Assessed valuation	Per capita assessed valuation
1955	117,500	\$124,867,100	\$1,060
1956	122,250	145,275,400	1,189
1957	122,250	152,358,000	1,247
1958	125,500	158,231,400	1,261
1959	131,400	164,428,700	1,251
1960	135,500	178,833,100	1,320
1961	139,300	184,091,100	1,320
1962	144,900	193,580,000	1,336
1963	150,600	207,902,810	1,380

<sup>1/</sup> As of June 30.

Historical per capita assessed valuation for the North Bay area was estimated only for 1960. This value was estimated to be \$1,020 per capita, considerably less than the overall county average. The fact that the per capita valuation is less for the north bay area than for the county is attributed to the effects of federal government installations.



Estimated future assessed valuations are a prime factor in determining the financial capability of the district to contract for state water. Estimates of future assessed valuation were based upon a combination of per capita assessed valuation and population projections. The population projections under low conditions of economic development discussed in Chapter II and the increase of per capita assessed valuation at a rate of ten dollars per capita per year were utilized for estimating future valuations. Projected assessed valuations under these conditions are shown in Table 21.

Table 21

PROJECTED ASSESSED VALUATION

Solano County				North Bay area of Solano County		
: Per capita:				: Per capita:		
Year:	Popula- tion	assessed valuation	Assessed valuation	Popula- tion	assessed valuation	Assessed valuation
1970	177,000	\$1,440	\$254,800,000	138,000	\$1,140	\$157,300,000
1980	241,000	1,540	371,100,000	177,000	1,240	219,500,000
1990	354,000	1,640	580,600,000	252,000	1,340	337,700,000

The use of low economic development population projections and modestly increasing per capita assessed valuation is considered sufficiently conservative for the purposes of analyzing financial capability. Most probably future populations within Solano County will be at some higher level than those utilized and it seems likely that per capita assessed valuation will equal or exceed estimated levels, particularly in view of the potential for location of major manufacturing industries and the general trend of increase prevalent throughout the State.

## Present and Projected Indebtedness

The Solano County Flood Control and Water Conservation District has no indebtedness at the present time, nor is any contemplated in the near future. However, both the entire district area and the portion within the North Bay area have incurred significant indebtedness for schools, water supply, sewage disposal, drainage, and other public services. Present bonded indebtedness and other types of indebtedness are indicated by category in Table 22 for the district and North Bay area.

TABLE 22

### PRESENT INDEBTEDNESS<sup>1/</sup>

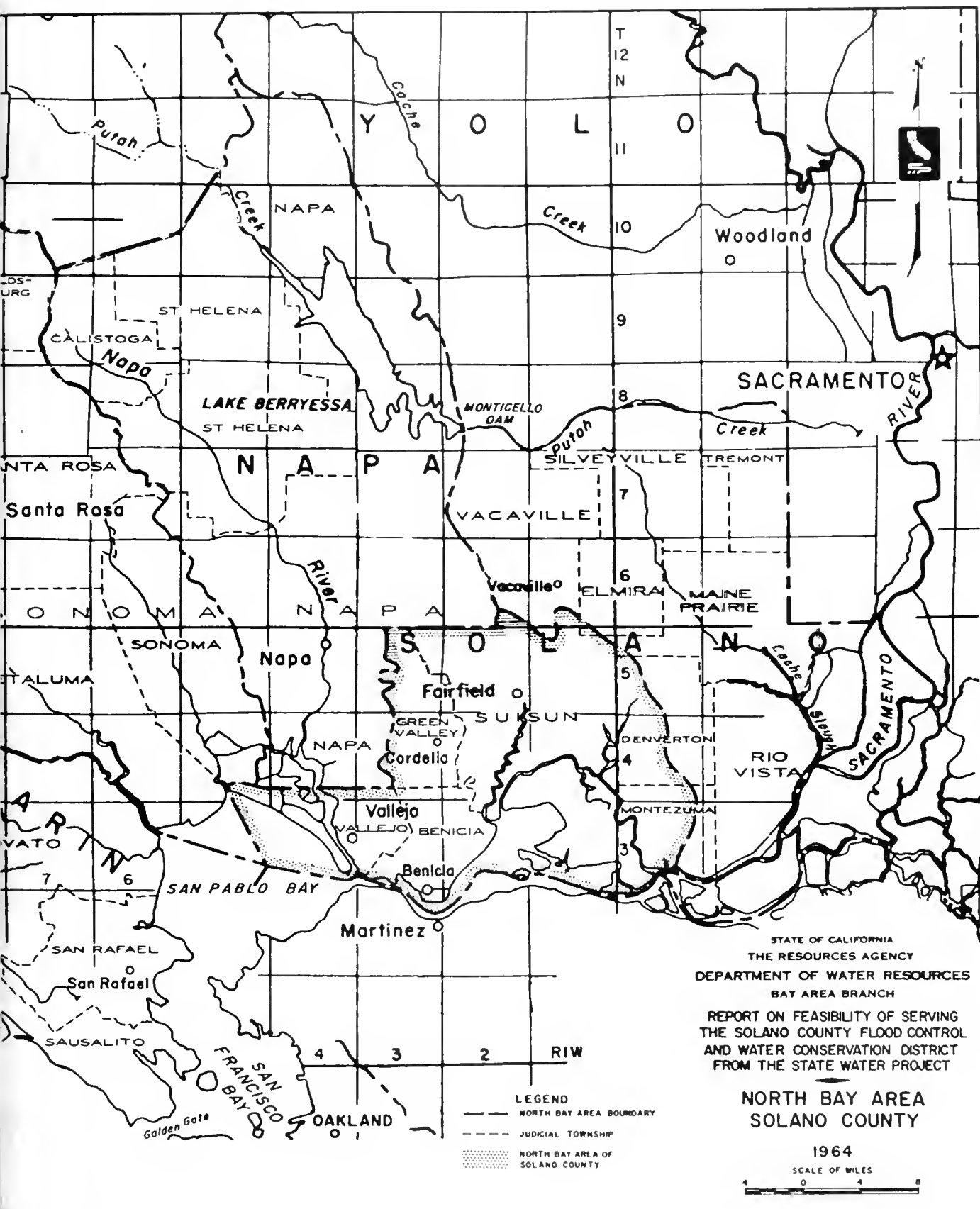
<u>Category</u>	<u>Solano County</u>	<u>North Bay area within Solano County</u>
County		
Cities	\$11,076,000 <sup>2/</sup>	\$ 7,306,000 <sup>2/</sup>
Special districts	7,156,537 <sup>2/</sup>	7,095,000 <sup>2/</sup>
School districts		
Bonds	12,503,900 <sup>2/</sup>	9,052,000 <sup>2/</sup>
Public school building fund	261,100	26,000
State school building fund	5,481,300	4,595,900
Solano Irrigation District	12,348,300	4,321,900
Total	\$48,827,137	\$32,396,800

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<sup>1/</sup> As of June 30, 1962

<sup>2/</sup> Bonded indebtedness

While assessed valuation has, in the county and North Bay area, generally increased at a rate of five percent annually during the last several years, indebtedness has increased more rapidly. Historical bonded indebtedness and other types of indebtedness are indicated in Table 23.





STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
BAY AREA BRANCH

REPORT ON FEASIBILITY OF SERVING  
THE SOLANO COUNTY FLOOD CONTROL  
AND WATER CONSERVATION DISTRICT  
FROM THE STATE WATER PROJECT

## EXISTING WATER DEVELOPMENT FACILITIES IN SOLANO COUNTY

1964

SCALE OF MILES







Table 23  
HISTORICAL INDEBTEDNESS<sup>1/</sup>

<u>Year</u> <sup>2/</sup>	<u>Solano County</u>	<u>Percent assessed valuation</u>	<u>North Bay area within Solano County</u>	<u>Percent assessed valuation</u>
1956	19,125,700	13.1	16,181,600	18.7
1957	23,136,900	15.2	19,317,100	21.1
1958	26,053,600	16.4	22,068,300	23.4
1959	31,211,000	19.0	23,101,800	23.1
1960	36,634,000	20.5	25,074,000	22.7
1961	45,213,400	24.5	31,578,900	27.7
1962	48,827,137	25.2	32,396,000	27.0

1/ Includes all categories listed in Table 22.

2/ As of June 30.

The additional public services which will be required for the projected population increases in Solano County and the methods of financing the capital investments required for these services have not been analyzed in the studies basic to this report. Therefore, for the purposes of this report, it has been assumed that indebtedness of the district and the north bay area under conditions of low economic development will be maintained at existing levels of 25.2 and 27.0 percent, of the assessed valuation respectively. Maintenance of indebtedness at these levels would allow adequate room for expansion of water distribution and treatment systems as well as other capital improvement programs, which will be required to support the moderate population growth under conditions of low economic development. Future indebtedness, based upon this assumption, is indicated in Table 24.

Table 24

## FUTURE INDEBTEDNESS

Solano County			North Bay area of Solano County		
Percent of :			Percent of :		
<sup>1/</sup> assessed :	Bonded		assessed :	Bonded	
Year :	valuation :	indebtedness	valuation :	indebtedness	
1971	25.2	\$ 64,300,000	27.0	\$42,500,000	
1980	25.2	93,500,000	27.0	59,300,000	
1990	25.2	146,000,000	27.0	91,000,000	

<sup>1/</sup> As of June 30.Ad Valorem Taxes

Property taxes upon lands within the Solano County Flood Control and Water Conservation District vary widely. The average tax rate in fiscal year 1961-62, based upon total property taxes and assessed valuation, was estimated to be \$6.83 per \$100 of assessed valuation in the district area and \$7.53 per \$100 of assessed valuation in the North Bay area of the district. The distribution of this tax among specific components is contained in Table 25.

Table 25

PRESENT AD VALOREM TAXES IN SOLANO COUNTY<sup>1/</sup>

		Ad valorem tax rate (per \$100 assessed valuation)	
			North Bay area of Solano County
Component	County		
General county tax	\$2.02		\$2.02
School districts	3.37		3.62
Cities and townships	1.06		1.36
Special districts	0.36		0.51
Solano County Flood Control and Water Conservation District	0.02		0.02
Total	\$6.83		\$7.53

<sup>1/</sup> As of June 30, 1962.



Property taxes in the area have generally increased during the past several years. These increases are typical of increases occurring throughout California and are the result of the increasing demand for public services and the post war burden placed upon the public school system. Historic and valorem taxes are indicated in Table 26.

Table 26

HISTORICAL AD VALOREM TAXES IN SOLANO COUNTY

<u>1/</u> Year	: Total ad valorem tax (per \$100 assessed valuation) : Solano County : North Bay area of Solano County	
1956	\$5.09	\$ --
1957	5.49	6.55
1958	5.73	6.44
1959	5.81	6.64
1960	6.39	7.25
1961	6.75	7.49
1962	6.83	7.53

1/ As of June 30.

Capability to Meet Contract Obligations

The capability of the Solano County Flood Control and Water Conservation District to finance its obligations resulting from the contract for water service from the North Bay Aqueduct can be determined by the resolution of two questions. These questions are:

(1) Will the payments which will be made under the contract place the lands within the district in the position of being unable to finance capital improvements for other public services and (2) can the district legally and financially meet the minimum obligations of the contract with ad valorem taxation if water revenues are insufficient?

Effect upon Indebtedness. The aggregate unpaid costs under the contract for North Bay Aqueduct water will be approximately \$2,750,000 in 1979. In 1979, the assessed valuation of the district under conditions of a reduced rate of economic development should approach or exceed \$360,000,000 and for the north bay area within Solano County the amount should be \$210,000,000. The aggregate unpaid balance under the water supply contract with the State would then represent less than one percent of the assessed valuation of the district and about one and one-half percent of the North Bay area assessed valuation. Detailed comparisons of North Bay Aqueduct contract aggregate unpaid balances with assessed valuation are contained in Table 27.

Table 27

SUMMARY OF CAPITAL REPAYMENT OBLIGATIONS  
RESULTING FROM NORTH BAY AQUEDUCT CONTRACT

Year:	: Unpaid : :aggregate of: :costs under :		Assessed valuation		: Percent of : assessed valuation	
	: Solano : : County :		: North Bay area : : of Solano County :		: Solano:North Bay area :County:of Solano Cour	
	contract		of Solano County		County:of Solano Cour	
1970	\$	720,000	\$254,800,000	\$157,320,000	0.3	0.5
1979		2,738,000	359,400,000	213,300,000	0.8	1.3
1980		2,713,000	371,140,000	219,480,000	0.7	1.2
1990		2,538,000	580,560,000	337,680,000	0.4	0.8

The major expenditures associated with the construction of the local conveyance and treatment facilities for North Bay Aqueduct water will also be incurred during the period 1973-79. In Chapter IV it was estimated that a capital expenditure of approximately \$6,500,000 would be required for these facilities. A total aggregate cost in excess of \$9,000,000 will be associated with the initial delivery of water from the North Bay Aqueduct in 1980.

Under the condition of a reduced rate of economic development, construction of conveyance and treatment facilities will probably be deferred several years. Therefore, an analysis of the financial aspects of these facilities has been omitted from this report.

Effect Upon Ad Valorem Tax Rate. Under conditions of a reduced rate of economic development, it is possible that water revenues to the district would be insufficient to fully meet the repayment obligations of the North Bay Aqueduct. These obligations would then have to be met through the levy of ad valorem taxes. The tax rates required to be levied by the district to meet the allocated capital and minimum overhead, maintenance, and replacement cost obligations of the North Bay Aqueduct contract are indicated in Table 28.

Table 28

TAX RATE REQUIRED FOR REPAYMENT  
OF PRINCIPAL AND MINIMUM ANNUAL CHARGES  
OF THE NORTH BAY AQUEDUCT

Year	: Assessed valuation : of Solano County	: Amount of : contract : repayment	: Tax rate per : \$100 assessed : valuation
1970	\$254,800,000	\$ 30,600	\$.02
1979	359,400,000	77,500	.01
1980	371,140,000	218,000	.059
1990	580,560,000	223,000	.038

An analysis of the tax rates, which might be levied if a zone within the district was formed with boundaries corresponding to the North Bay area, was not undertaken in this report. However, on the basis of assessed valuations, it would appear that a tax

rate of less than twice those in Table 28 would be required.

A portion of the district's payment of costs of water from the Solano Project is met by ad valorem taxation. This includes a subsidy of \$0.40 per acre-foot for all agricultural water deliveries and an operational cost of \$0.35 per acre-foot for all deliveries. In 1970 these costs may exceed \$150,000, an amount which could be met by a \$0.06 per \$100 of assessed valuation ad valorem tax. After 1970 the tax rate required for handling Solano Project costs will gradually reduce. Hence, sufficient taxing capability should be available to meet the minimum operation, principal and interest costs of the North Bay Aqueduct.

Ad valorem taxation may also be required to finance the construction of those conveyance and treatment facilities that would be required upon completion of the North Bay Aqueduct. Either special districts or the municipalities involved will levy these taxes. The maximum tax rate per \$100 of assessed valuation required for these purposes will not exceed \$0.15.

## CHAPTER VI. SUMMARY AND CONCLUSIONS

The pertinent information presented in this report is summarized and conclusions are presented in the following sections.

### Summary

1. The Solano County Flood Control and Water Conservation District was formed in 1951 for the purposes of controlling and conserving surface water supplies and contracting with other entities for the storage, delivery, and sale of water supplies. It is empowered to levy taxes for the purpose of paying any obligation of the district and to accomplish the purposes of the district.

2. Based on current contracts, a maximum entitlement of 67,000 acre-feet has been allocated to the North Bay Aqueduct with an additional 10,200 acre-feet allocated as option water under Article 8 of the Standard Provisions for Water Supply Contract.

3. The importance of agriculture in Solano County is demonstrated by the rapid growth of land under irrigation from 55,000 acres in 1949 to nearly 110,000 acres in 1959. Since 1959, the initial year of delivery of agriculture water from the Solano Project, an additional 40,000 acres of the Solano Irrigation District, have been brought under irrigation. It is estimated 21,500 acres of land outside the Solano Irrigation District could be economically irrigated by 1990.

4. Surface water for the district is supplied from miscellaneous streams which run off the Vaca Mountains and the ranges between Napa and Fairfield. Use of ground water is made in the Fairfield-Suisun area and in Green Valley north of Cordelia.

5. Water is presently distributed in the North Bay area of Solano County from the Solano Project via the Putah South Canal, from the Cache Slough Diversion to the City of Vallejo, and imported from Conn Lake of the City of Napa to the City of Benicia.

6. The rapid growth of population in Solano County, estimated to be 458,000 by 1990, and the potential development of the Benicia Arsenal property are prime factors in developing the need for supplemental municipal and industrial water.

7. The location of major military installations within Solano County constitutes a major factor in the economy of the county. For the purposes of estimating water requirements, it was assumed that activities of these installations would remain near present levels.

8. The total supplemental water requirement of the North Bay area of Solano County is estimated to be 38,650 acre-feet annually in 1990.

9. The State Water Project can provide water to the district at an equivalent unit rate of \$14.53 per acre-foot.

10. The 1962 assessed valuation of the Solano County Flood Control and Water Conservation District's service area was \$193,580,000 and it is estimated it will increase to about \$580,600,000 by 1990.

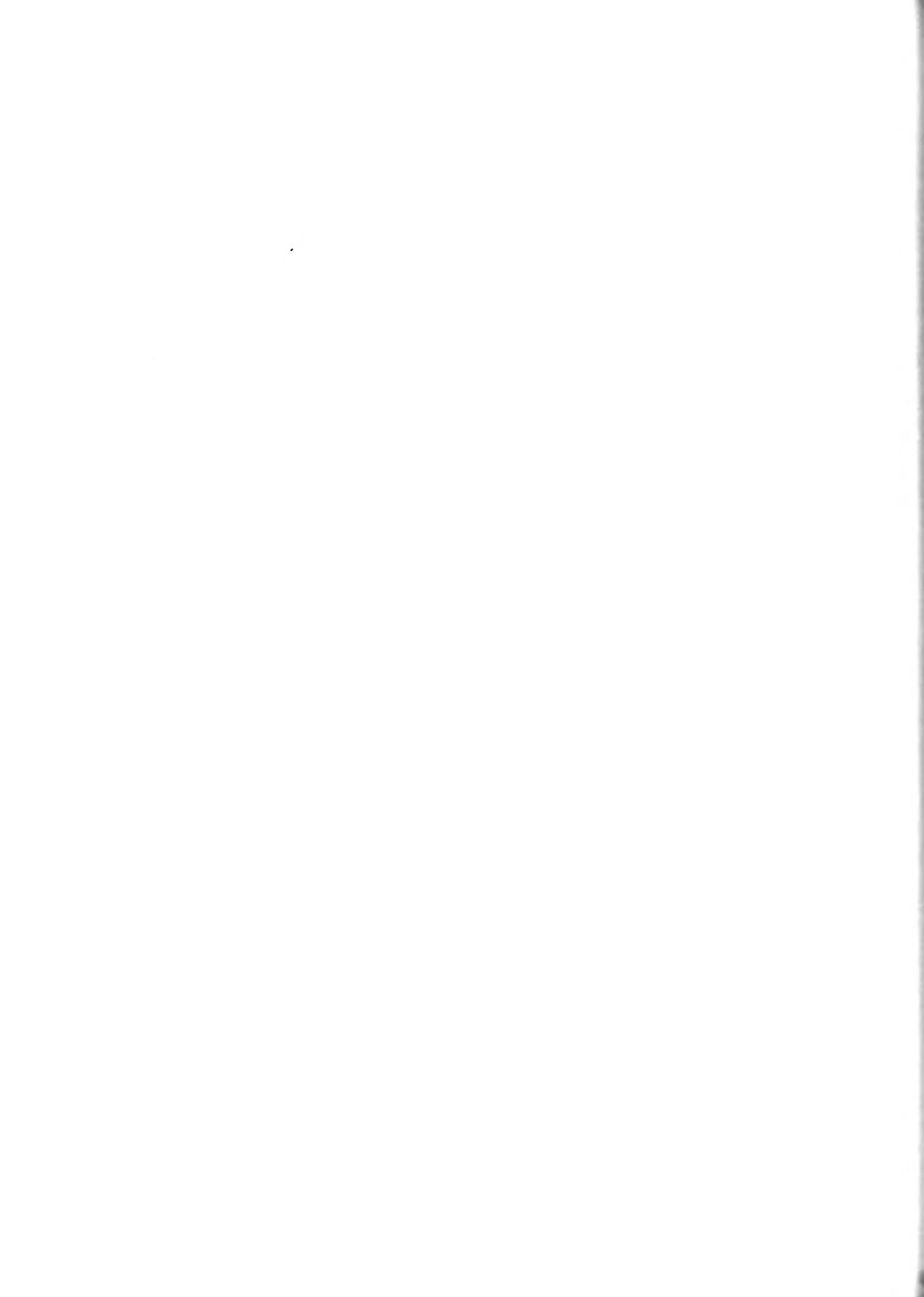
11. The Solano County Flood Control and Water Conservation District has no present bonded indebtedness. The 1961-62 bonded indebtedness of the district service area was about \$30,740,000. The ratio of debt to assessed valuation was 15.8 percent.

### Conclusions

1. The State of California has the necessary water supply and the authority to enter into a contract with the Solano County Flood Control and Water Conservation District, which was signed December 26, 1963, for a maximum annual entitlement of 42,000 acre-feet of water per year and includes an option to increase the amount of the contract by the district's share of the project yield uncontracted on December 31, 1963.

2. The Solano County Flood Control and Water Conservation District has the authority, the necessity, and the financial capability to enter into a contract with the State of California for a maximum annual entitlement of 42,000 acre-feet of water per year.

3. The contractual cost to the district can be met with a sound financial program based on the ability of users to pay for water and ad valorem assessments for benefits accruing from importation of water from the State Water Project.





APPENDIX A

CREDIT ANALYSIS OF THE  
SOLANO COUNTY FLOOD CONTROL  
AND WATER CONSERVATION DISTRICT



Appendix A

CREDIT ANALYSIS OF THE  
SOLANO COUNTY FLOOD CONTROL  
AND WATER CONSERVATION DISTRICT

A. Statement of Debt of Solano County Flood Control and Water  
Conservation District Area

1. Net Direct Debt (full faith and credit)

a. Bonds: none.

b. Floating Debt: none.

c. Total debt: none

2. Special Obligations (not full faith and credit): none.

3. Limitation on Debt.

a. Promissory notes: Indebtedness other than bonds cannot exceed in any year the income and revenue provided for such year.

b. Bonds may be issued by the agency if approved by a 4/5 vote of the board of directors or a 2/3 favorable vote of the agency's electorate. Bond maturities are limited to 40 years and interest rates may not exceed 6 percent per annum. Aggregate bonded and contractual indebtedness limited to the amount which can be liquidated by an ad valorem tax not exceeding 15¢ on each \$100 assessed valuation, plus capital obligations underwritten by member units plus amounts which they agree to pay for a water supply.

c. Applicable Statutes: Solano County Flood Control and Water Conservation District Act, Stats. 1951, Chapter 1656, Sec. 11.1.

4. Amount of Bonds Authorized but Unissued: none.

5. Utilities Operated by the District: none. The district contracts with the Solano Irrigation District for operation and maintenance of the Putah South Canal.

B. Debt of Overlapping, Coterminous and Underlying Political Units:

Type of unit	:	Net debt	:	Date of statement
Reclamation District 2068	\$	61,537		June 30, 1962
Fairfield-Suisun Sewer District		950,000		"
Vallejo Sanitation and Flood Control District		6,145,000		"
Solano Irrigation District		13,373,670		Dec. 31, 1962
City of Vallejo		4,797,000		June 30, 1962
City of Dixon		60,000		"
City of Fairfield		1,499,000		"
City of Suisun		185,000		"
City of Vacaville		3,460,000		"
City of Benicia		825,000		"
City of Rio Vista		250,000		"
Total of districts <sup>1/</sup>		<u>\$18,246,300</u>		
TOTAL DEBT		<u>\$49,852,507</u>		

<sup>1/</sup> Includes Public and State School Building Fund Debts

2. Additional Debt Information: The largest single debt in the county is that owed to the Bureau of Reclamation for the Solano Project, in the amount of approximately \$37,000,000 to be paid for by water sales from the project.

C. Summary of Full Faith and Credit Debt of the District and Other Political Entities

Type of debt <sup>1/</sup>	As of June 30 (in \$1,000)				
	1958	1959	1960	1961	1962
Net bonded debt	0	0	0	0	0
Net floating debt	0	0	0	0	0
Overlapping, etc. debt	\$26,054	\$31,211	\$36,634	\$45,213	\$48,827
<b>TOTAL DEBT</b>	<b>\$26,054</b>	<b>\$31,211</b>	<b>\$36,634</b>	<b>\$45,213</b>	<b>\$48,827</b>

<sup>1/</sup> Solano Irrigation District indebtedness is estimated as of June 30.

D. Default Record. There has been no default either in the payment of principal or interest, by either the county or by any overlapping, coterminous or underlying taxing district in recent years.

E. Assessed Valuations of Property in Solano County

Type of property:	(Thousands of dollars)				
	1959-60	1960-61	1961-62	1962-63	1963-64
Secured	\$129,540	\$142,516	\$146,065	\$152,037	\$166,428
Unsecured	8,189	9,517	9,392	9,946	9,505
Utilities	26,699	26,800	28,634	31,597	31,970
<b>TOTAL ASSESSED VALUE</b>	<b>\$164,428</b>	<b>\$178,833</b>	<b>\$184,091</b>	<b>\$193,580</b>	<b>\$207,903</b>
<u>Estimated Market Value</u>	\$641,983	\$697,807	\$736,119	\$740,947	\$779,114

2. Assessment Ratio (Proportion of Market Value)
  - a. Real property: 24.6 percent
  - b. Personal property: 24.6 percent
  - c. Utilities: 50 percent
  - d. Source of estimate: State Board of Equalization  
Annual Report, 1962-63
3. Important Tax Exempt Property within the District:

The principal tax exempt properties in Solano County are:

Benicia Arsenal

Mare Island Naval Shipyard

Travis Air Force Base

Vacaville Medical Facility
4. Concentrations of Valuable Property just Outside the Service Area. There are no concentrations of valuable property just outside of the service area that are not included within the boundaries of other public water agencies.
5. Ten Largest Taxpayers in the Area. The ten largest taxpayers in the district, excluding public utilities, collectively contribute approximately 5 percent of the total taxes collected.

. Property Tax Rates in Solano County

Tax rate components	Weighted average tax rates in dollars per \$100 assessed valuation				
	1958-59	1959-60	1960-61	1961-62	1962-63
County	\$1.68	\$1.93	\$2.05	\$2.02	\$2.01
Cities	0.81	1.00	1.05	1.06	1.06
School districts	2.93	3.07	3.27	3.37	3.28
Special districts	0.38	0.37	0.36	0.36	0.36
S.C.F.C. & W.C. Dist. <sup>1/</sup>	<u>0.01</u>	<u>0.02</u>	<u>0.02</u>	<u>0.02</u>	<u>0.02</u>
TOTAL RATE	<u>\$5.81</u>	<u>\$6.39</u>	<u>\$6.75</u>	<u>\$6.83</u>	<u>\$6.73</u>

1/ Solano County Flood Control and Water Conservation District.

2. Assessment Roll: Taxes for all districts are levied from the **assessment** roll.
3. Taxes by Classification of Property: Tax rates apply to all classes of taxable property, whether real or personal, secured or unsecured.
4. Division of Tax Rates into Separate Levies: Tax rates are consolidated for most purposes.

G. Record of Tax Collections

1. Tax Collections <sup>1/</sup>					
Fiscal year	Amount levied	Cash collection in year of levy		Uncollected at end of fiscal year	
		Amount	Percent	Amount	Percent
1961-62	\$12,509,139	\$12,199,809	97.5	\$309,330	2.5
1960-61	12,135,830	11,996,918	98.9	138,912	1.1
1959-60	<u>10,615,654</u>	<u>10,585,014</u>	<u>99.7</u>	<u>30,640</u>	<u>0.3</u>
TOTAL	\$35,260,623	\$34,781,741	98.6	\$478,882	1.4

<sup>1/</sup> Taxes levied for school districts were taken from appropriate California Statistical Abstracts. All other figures were taken from appropriate Annual Reports of Financial Transactions.

2. When Taxes are Due:

- Due dates: One-half of tax levy due each on November 1 and February 1.
- When delinquent: December 10 and April 10 following due date.
- Penalties: Penalties attach as of the delinquent date, to the extent of six percent and eight percent of each delinquent installment on the secured and unsecured roll, respectively. No discounts are allowed for prompt payment. Penalties are enforced.

3. Tax Sales. Tax sales are not regularly held by the county.

4. Estimated Tax Delinquency. A tax payment delinquency, based on previous years experience is estimated for budget purposes and for computing necessary tax levies and rates for the ensuing year.



5. Collection of Taxes: The district does not collect its own taxes or the taxes of other taxing districts.

H. Receipts and disbursements of the Solano County Flood Control and Water Conservation District

		Fiscal year			
Receipts and disbursement items		1961-62	1960-61	1959-60	1958-59
1.	Cash balance, beginning of year	\$ 40,082.42	\$ 11,717.46	\$ 10,278.24	-----
2.	<u>Receipts</u>				
a.	General property tax				
	current levy	36,040.00	37,753.29	31,193.59	\$14,773.03
	prior levies	. 886.14	740.04	254.11	-----
b.	Water sales	284,958.06	287,595.60	73,073.25	3,375.00
c.	In lieu tax and refunds	214.59	168.23	168.23	84.11
d.	Inter-government contracts	8,969.08	10,107.97	5,703.35	-----
e.	Delivery tax sale trust	<u>1.12</u>	<u>1.50</u>	-----	-----
f.	TOTAL RECEIPTS	331,068.99	333,366.63	110,392.53	18,232.14
3.	<u>Non-income receipts</u>				
a.	Refund of advance to zone of benefit	7,919.61	19,923.02		
b.	Refund of advance to general fund	<u>6,004.54</u>			
c.	TOTAL NON-INCOME RECEIPTS	<u>\$ 13,924.15</u>	<u>\$353,288.15</u>	<u>\$110,392.53</u>	
d.	TOTAL RECEIPTS PLUS NON-INCOME RECEIPTS	\$ 344,993.14	\$353,288.15	\$110,392.53	\$ 18,232.14
e.	TOTAL CASH PLUS RECEIPTS (INCOME AND NON-INCOME)	<u>\$ 385,075.56</u>	<u>\$365,007.11</u>	<u>\$120,670.77</u>	<u>\$ 18,232.14</u>

# H. Receipts and disbursements of the Solano County Flood Control and Water Conservation District

	Fiscal Year		
	1961-62	1960-61	1959-60
Receipt and disbursement items	1961-62	1960-61	1959-60
4. Disbursements			
a. Professional services	\$ 5,862.77	\$ 2,693.69	\$ 13,515.93
b. Putah-South Canal - operation and maintenance	65,498.92	41,008.69	22,634.58
c. Water purchases	273,778.31	259,309.60	66,007.45
d. Bureau of Reclamation district	6,746.81	13,993.10	5,703.35
e. Supplies	-----	-----	-----
f. TOTAL DISBURSEMENTS	\$351,886.81	\$317,005.08	\$108,953.31
5. Nonexpenditure disbursement			
a. Advance to zone of benefits	32,629.22	7,919.61	
6. Total disbursements plus nonexpenditure disbursements	384,516.03	324,924.69	108,953.31
7. Cash balance, end of year	\$ 559.53	\$ 40,082.42	\$ 11,717.46
			\$10,278.24

- I. Sinking Fund Operations: There are no sinking funds being operated by the district at the present time.
- J. Future Debt Service Requirements: None exist for the district as an entity at the present time.
- K. Management and Services
  - 1. Fiscal policies: Fiscal policies include the adopting of an annual budget. The county board of supervisors are ex officio board of directors and control the fiscal matters with the same responsibility as their duties to general county government.
  - 2. General Character and Efficiency of the Management: Management is accomplished by county officials. This provides qualified personnel well versed in management and budgetary control. The district has for several years been engaged in the administration of their contract for water from the Solano Project of the U. S. Bureau of Reclamation.
  - 3. Services Performed by the Agency: The district's primary function is to conserve and make available sufficient water for present and future beneficial uses by lands and consumers within the boundaries of the district.
- L. Economic Background
  - 1. Land Area. Solano County has an area of 585,200 acres, 50,700 acres of which are water area.

## 2. Population of Solano County

<u>Year</u>	<u>Population</u>
1920	40,602
1930	48,834
1940	49,118
1950	104,833
1960	134,597
1963 (est)	150,600

## 3. Employment

<u>Industry group</u>	<u>Number employed</u>	
	<u>1950</u>	<u>1960</u>
Professional	2,602	4,255
Farm and farm managers	1,006	846
Managers and officials	2,519	3,179
Clerical	3,820	5,844
Sales	2,025	2,286
Craftsmen	7,587	7,013
Operatives and kindred workers	4,817	4,662
Service workers	2,900	3,845
Laborers	3,805	3,035
Misc.	1,167	3,073
TOTAL	32,248	38,038

## 4. Agriculture

<u>Crop</u>	<u>Total crop value</u>				
	<u>1962</u>	<u>1961</u>	<u>1960</u>	<u>1959</u>	<u>1958</u>
Tomatoes	5,844,000	4,320,000	4,894,400	2,930,450	3,564,000
Cattle & calf	4,550,000	3,600,000	4,449,750	4,550,000	4,450,000
Sugar beets	4,542,000	3,640,000	4,477,000	4,920,048	3,161,469
Sheep & lambs	2,140,000	1,930,000	2,675,200	2,859,500	3,232,631
Pears	2,009,000	2,085,000	1,655,996	1,563,373	1,062,644
Prunes	1,120,000	1,554,000	2,302,420	1,717,638	1,178,300
Barley	2,047,000	1,771,000	1,540,000	1,360,800	1,008,000
Milk	1,779,000	1,579,000	1,554,053	1,577,282	1,586,050

5. Industry. (Excluding federal payroll which comprises well over one-half of all wages and salaries of county residents.)

a. Principal industries.

1. Food processing and packaging (approximately 50 percent of total).
2. Machinery
3. Printing and publishing
4. Lumber
5. Transportation equipment
6. Instruments

b. Large industrial firms in the area

More Meat  
Blackwelder Mfg.  
Amerada Petroleum  
Standard Oil  
Nut Tree  
Yuba Mfg. Co.  
American Pad and Textile  
Sperry Flour  
Vaca Creamery  
Basic Vegetable  
Stoeven Brothers  
P.G.&E.  
P.T.&T.

6. Trade

The City of Vallejo is the leading trade center of the county, accounting for a major share of its wholesale and retail trade. From the standpoint of dollar volume, food and automotive sales constitute the leading types of business in the county.

7. Transportation. Solano County is served by the Southern Pacific and Sacramento Northern railroads. The major highway network in Solano County consists of 240 miles of state highways and 750 miles of county roads, 260 miles of which are primary roads. Seven airports serve the county, including Travis Air Force Base, one municipal, and five private fields.
8. Natural Resources. There are no mineral or lumber activities of major importance in Solano County. Land is the major natural resource and provides a major source of the county's income.

Major recreation facilities include a marina located at Vallejo and one under construction at Suisun. Other facilities include fishing ramps located at Rio Vista and Vallejo.

M. Financial Data for Solano County Flood Control and Water Conservation Area

1. General data

a. Population

1950	104,833
1960	134,597
1962	143,300 (Est.)

- b. Assessed valuation (1962)      \$193,580,000  
Basis of assessment                      23.9%  
Estimated full valuation              740,947,000
- c. Bonded indebtedness (1962)      30,736,437
- d. Tax levied                              12,509,139

2. Capita Data

a. Assessed valuation	\$1,351
b. Estimated full valuation	5,170
c. Bonded indebtedness	214
d. Tax levied	87

3. Ratios

a. Tax supported bonded  
indebtedness as percent  
of:

1. Assessed valuation	15.8%
2. Estimated full valuation	4.1%
3. Tax levied	245.7%

b. Percentage increase

1. Population, 1950 to 1960	28.4%
2. Assessed valuation, 1950 to 1962	130.9%
3. Bonded indebtedness, 1956 to 1962	86.0%
4. Taxes levied 1957-58 to 1961-62	41.6%

















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